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Hence there are six sets of solutions:

$$x=0,\ y=0;\ x=-\frac{p}{m}\omega^3,\ y=-\frac{p}{m}\omega^2.$$

(2) Solution of the simultaneous equations

$$mx^4+py=0,\ my^3+px^3=0.$$

In addition to the solutions $x=y=0$, there are exactly nine sets of solutions

$$x=\varepsilon p^{4/9}m^{(-4)/9},\ y=-\varepsilon^4 p^{7/9}m^{(-7)/9},$$

where ε is an arbitrary ninth root of unity.

165. Proposed by J. K. ELLWOOD, A. M., Principal of Colfax School, Pittsburg, Pa.

Solve $x^4-x=14$, by quadratics.

Solution by G. B. M. ZERR, A.M., Ph.D., Professor of Chemistry and Physics, The Temple College, Philadelphia, Pa.

$x^4-x=14$ or $x^4-16=x-2$.

$\therefore x^2-4=\dfrac{x-2}{x^2+4}=\dfrac{x}{x^2+4}-\dfrac{2}{x^2+4}$.

$\therefore x^2-\dfrac{x}{x^2+4}+\dfrac{1}{4(x^2+4)^2}=4-\dfrac{2}{x^2+4}+\dfrac{1}{4(x^2+4)^2}$.

$\therefore x=2$ or $x=-2+\dfrac{1}{x^2+4}$.

$\therefore x=2$ or $x^3+2x^2+4x+7=0$.

$\therefore x=2$ or $=-1\frac{1}{1}\frac{3}{5}$ nearly, or $-\frac{1}{15}[1\pm\sqrt{(-843)}]$ nearly.

166. Proposed by MARCUS BAKER, U. S. Geological Survey, Washington, D. C.

Solve
$$ax+by=2zx\ldots.(1).$$
$$cy+dz=2xy\ldots.(2).$$
$$ez+fx=2yz\ldots.(3).$$

Solution by the PROPOSER.

From (1), (2), and (3), respectively,

$$y=\frac{(2z-a)x}{b}=\frac{dz}{2x-c}=\frac{ez+fx}{2z},$$

whence
$$x(2x-c)(2z-a)=bdz\ldots.(4),$$
$$fx(2x-c)+ez(2x-c)=2dz^2\ldots.(5).$$

From (4), $z=\dfrac{ax(2x-c)}{2x(2x-c)-bd}$, which substituted in (5), gives, after reduction,

$$x^4+\frac{1}{2f}(ae-2cf)x^3+\frac{1}{4f}[fc^2-a^2d-2(ace+bdf)]x^2$$

$$+\frac{1}{8f}[ac(ad+ce)+bd(2cf-ae)]x+\frac{1}{16f}bd(ace+bdf)=0.$$

Similarly,

$$y^4+\frac{1}{2b}(ac-2be)y^3+\frac{1}{4b}[fc^2-e^2b-2(ace+bdf)]y^2$$

$$+\frac{1}{8b}[ce(ae+cf)+df(2be-ac)]y+\frac{1}{16b}df(ace+bdf)=0.$$

$$z^4+\frac{1}{2d}(ce-2ad)z^3+\frac{1}{4d}[a^2d-e^2b-2(ace+bdf)]z^2$$

$$+\frac{1}{8d}[ac(ae+bc)+bf(2ad-ce)]z+\frac{1}{16d}bf(ace+bdf)=0.$$

Also solved by *LON C. WALKER.*

GEOMETRY.

REMARKS ON NO. 187, GEOMETRY, BY J. R. HITT, GOSS, MISS.

There seems to be an error in (4) of Professor Zerr's demonstration of No. 187, Geometry. The result given is not correct. For $t=\frac{1}{\sqrt{2}}b\sin C\cos C$, $t_1=\frac{1}{\sqrt{2}}b\cos C$, $t_2=\frac{1}{\sqrt{2}}b\sin C$, from which it is seen that in general t^2 cannot equal t_1t_2. It is also easily seen that if $t_1:t=t:t_2$, then must $DI=b$, whereas DI cannot be $>\frac{1}{2}b$.

CALCULUS.

154. Proposed by B. R. DOWNER, Hopkinsville, Ky.

At the equinox, when the sun is on the celestial equator, a man starts driving on a perfectly level plain at six o'clock in the morning, and continues, going always from the sun, at the uniform rate of six miles per hour, until six o'clock in the evening. Required the path he will travel and the distance in a straight line from starting point to stopping point.